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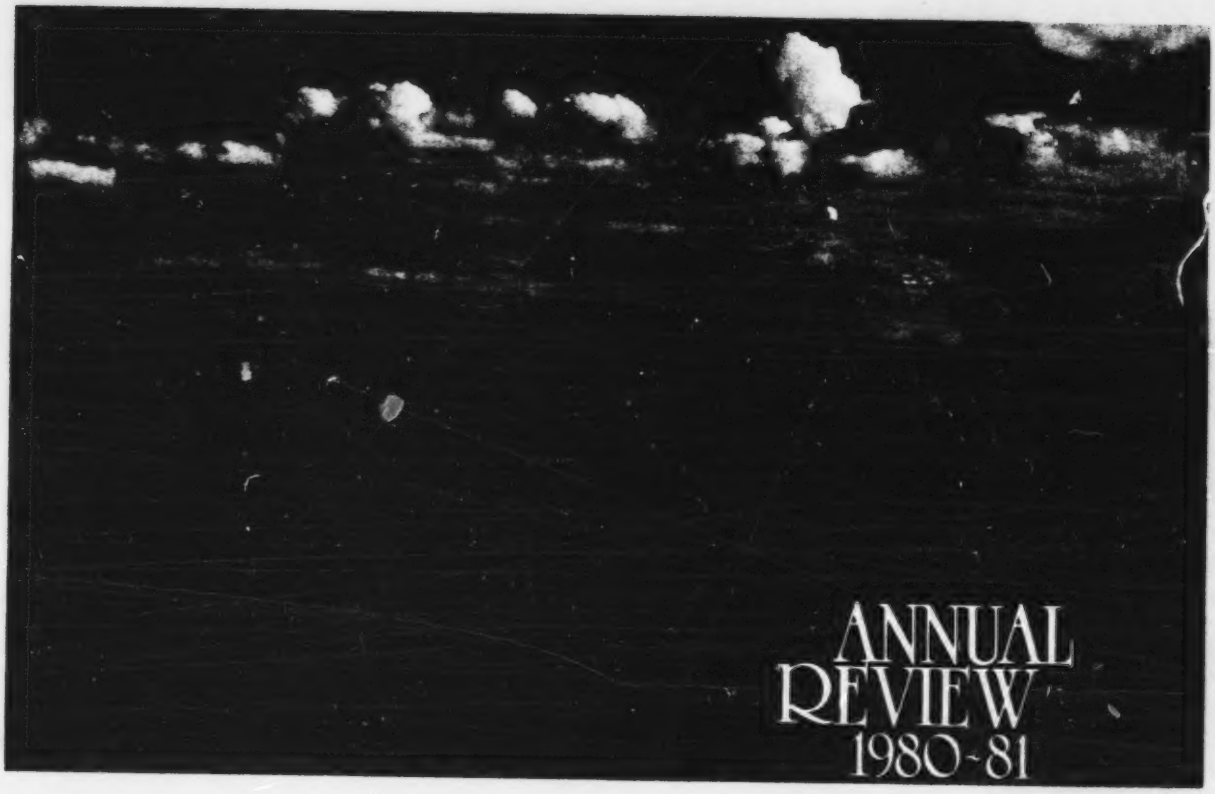

Alberta Environmental Centre

GOVERNMENT OF ALBERTA

ALBERTA ENVIRONMENTAL CENTRE

ANNUAL REVIEW

1980 - 1981

ALBERTA ENVIRONMENTAL CENTRE
VEGREVILLE, ALBERTA

AECV82-AR
May 1982

This Report May Be Cited As:
Alberta Environmental Centre. Annual Review 1980-81.
Vegreville, Alberta, May, 1982.
52 p. AECV82-AR

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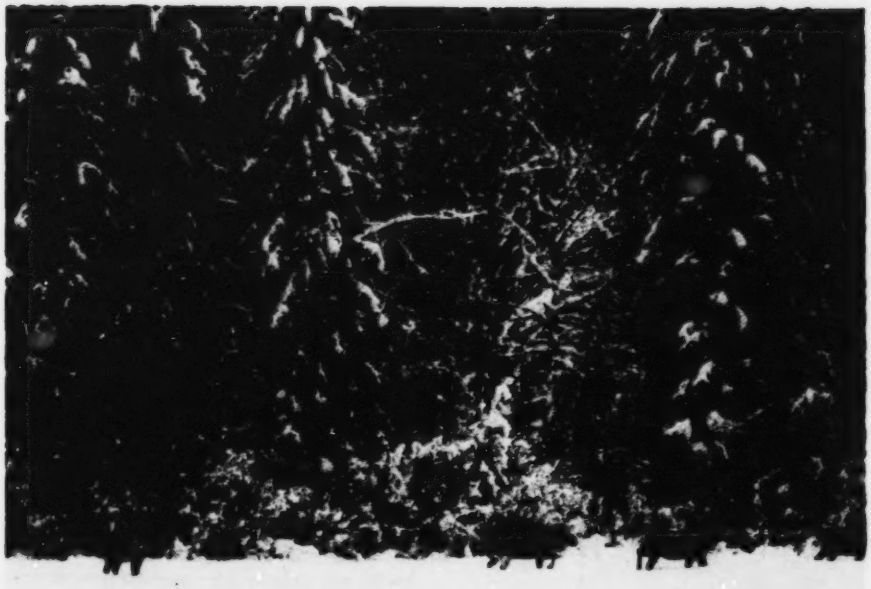


INTRODUCTION

Introduction

The Alberta Environmental Centre (AEC) is an interdisciplinary research and service agency which studies and solves environmental problems identified by departments and agencies of the Government of Alberta. In the 1980-81 fiscal year, the Centre moved from a developmental phase toward implementation of a broad program of interdisciplinary research and service activities. This annual review, the first for the Centre, describes the work of AEC and the way the organization functions. It outlines main activities and programs undertaken by the Centre in the year ending March 31, 1981.

History of the Centre goes back to 1973, two years after Alberta established the first environment department in Canada. In that year, the Provincial Cabinet approved the concept of building a new facility to provide the laboratory and research capability necessary to support provincial environmental goals.

In 1974, the Provincial Government announced that the Centre would be located in Vegreville, 90 kilometers east of Edmonton, in keeping with its policy of decentralization of government services and agencies. The tenders for construction of the main laboratory building were called in 1977.

The objective of AEC is to provide to Albertans, at the request of and in cooperation with other agencies, high quality services, research and technical development, in support of environmental protection, rehabilitation, control and management. The Centre undertakes studies to understand environmental problems and to solve them. In addition, it provides developmental, diagnostic, extension and analytical services to government agencies that request them.

Approved AEC programs include new work in key areas plus some work previously done by other government agencies. Research and service work at the Centre and in the field throughout Alberta spans a range of activities from radio-tracking of grizzly bears to routine testing of drinking water supplies. As well, Centre staff members have a significant role in dissemination of information to the public on subjects such as current pest management information for the province's farmers.

As the major focus of environmentally-related scientific work of the Government of Alberta, AEC works for all departments and agencies of the government. For administrative purposes, the Centre is attached to Alberta Environment. The Centre's Executive Director reports to the Deputy Minister of that Department. However, for purposes of project generation, planning, review, and approval, the Executive Director deals with a Board of Directors composed of Deputy Ministers or their equivalents from the major departments which use AEC services. Board members represent the user agencies and advise the Minister of Environment on projects, budgets, research priorities and general Centre policies.

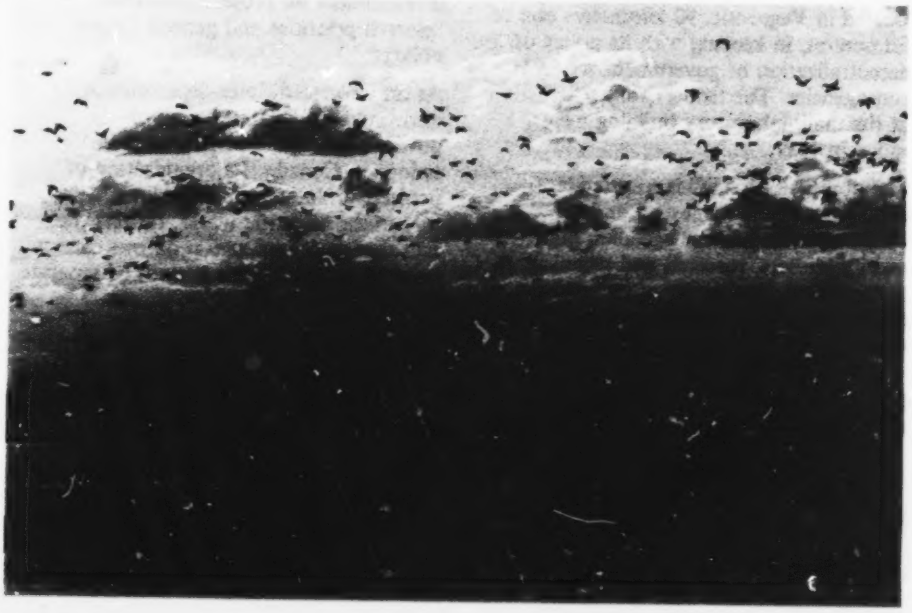
As an integrated, inter-departmental environmental facility for all of government, the Centre is a concept unique in Canada. Its organization of projects on interdisciplinary lines, also rare in the scientific world, reflects the fact that environmental problems cannot be confined within the bounds of separate fields of study.

This approach, drawing on the expertise of scientists from various fields, is a prime strategy towards meeting the AEC objective of becoming a "Centre of Excellence".

Inter-disciplinary Research

The interdisciplinary team approach to research is emerging as the most promising way of examining subjects which cannot be limited to the boundaries of traditional scientific disciplines, and perhaps more than in any other field, the study of problems of the environment demands this strategy. In AEC most programs undertaken follow this approach. Any part of the Centre may provide a project leader and expert consultants in its area of specialty, and may also participate in projects where others take the lead. For example, a study of atmospheric sulphur effects on animals may be led by a toxicologist, with input from specialists such as chemists and plant and animal scientists.

For administrative purposes AEC is organized on generally standard lines. There are five Wings; Plant Sciences, Chemistry, Animal Sciences, Environmental Technology, and Common Services. Within each Wing, there are Groups and Sections, each with specific expertise and responsibilities.



Project Approval

Before any research, service or developmental programs are undertaken at AEC, proposals are critically examined in a series of steps to ensure the work will be timely, relevant, and complete.

Since the beginning, work at AEC has emphasized programs compatible with the Centre's mandate for interdepartmental and interdisciplinary approaches.

Generation of a program or project normally starts with a government department or agency which requests that the Centre examine some problem. Client departments and agencies direct their requests to AEC through their representative on the Technical Advisory Committee (TAC), an advisory body made up of senior technical staff from client departments and the Centre's Executive Director.

At AEC, these research and development proposals are examined by the Centre's Management Committee and by staff members on an interdisciplinary team. The proposals then go back to the TAC which circulates them within departments for comments and suggestions. Finally, the TAC sends the proposals to the Centre's Board of Directors, which recommends to the Minister of Environment that the proposals be approved, altered or rejected.

Service work, such as chemical analyses, is also evaluated for economy, efficiency and effectiveness. The evaluation is carried out by AEC staff, the client requesting the work, and often a third person such as the client department's TAC member. Both new requests and reviews of the on-going work then go through the normal Technical Advisory Committee - Board of Directors review and approval process.

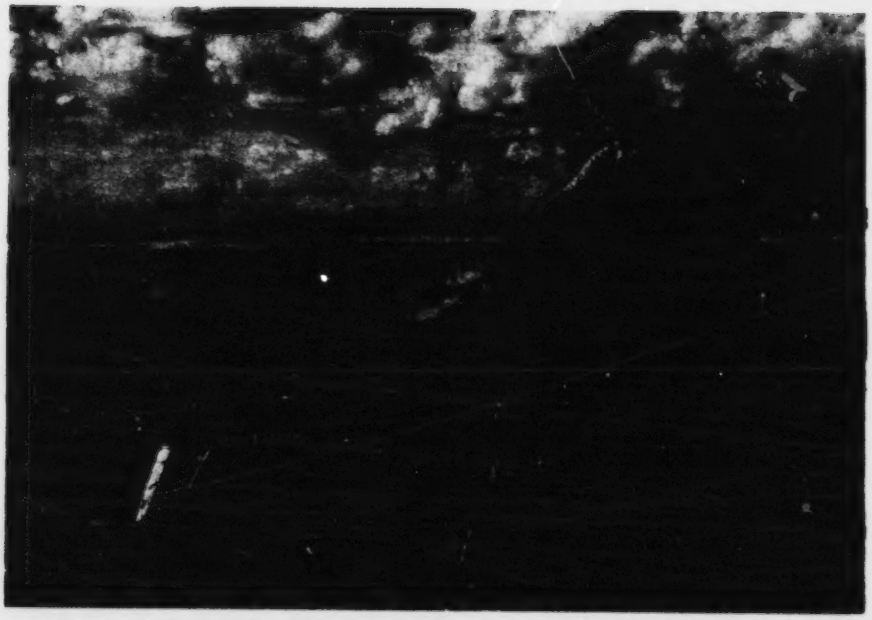
Facilities and Site

At the fiscal year's end a majority of the laboratory and research facilities were occupied and the Centre moved into its operational phase.

Design of the main laboratory building of 16700 square metres was undertaken from a functional approach; that is, its final form was determined by the functions to be carried out at AEC rather than by adapting the activities to a conventional laboratory design.

Centre facilities also include a 3100 square-metre Services Building, a small chemical waste treatment building, and a site manager's house. The facilities are located on a 300-hectare site, more than half of which is suitable for crop production.

The Centre awarded several major developmental contracts during the year; included were completion of the Services Building, landscaping, interior and exterior signage, completion of some specific laboratory areas, and construction of chemical waste treatment lagoons.



PLANT SCIENCES WING

Plant Sciences Wing

This Wing became active in 1979 when Alberta Agriculture's Plant Industry Laboratory was transferred to the Alberta Environmental Centre. During the past year, the three Sections comprising the Wing's Pest Management Group -Entomology, Plant Pathology and Weed Science - moved from Edmonton to the Vegreville facility.

The Pest Management Group carried out a program of applied research, and provided a range of diagnostic and advisory services to agricultural producers and provincial Agriculture Department staff. The Group provided backup resources for Alberta Agriculture Regional Crops Laboratories in Fairview, Olds and Brooks, and acted as Regional Crops Laboratory for north-central and north-east Alberta. Major advisory and diagnostic services covered plant diseases, crop and livestock insect pests, weed control, plant identification and suspected chemical damage to crops.

Expanded research activities included investigations of the biology and impact of Bertha armyworms, biological control of greenhouse insect pests, control of insect pests of cattle, and crop tolerance to herbicides.

Staff members also participated in extension meetings, lectured at university and college courses, prepared information bulletins, and performed other similar extension and education duties.

Work also progressed toward establishing a Reclamation Group to study revegetation and rehabilitation of disturbed sites. This Group will consist of an Ecology Section to select, test and propagate native species of grasses, legumes and shrubs, and a Soils Section to deal with soil physics and nutritional problems of land reclamation of non-agricultural sites.

Weed Science Section

The Section provided diagnostic, advisory and extension services on weeds and weed control, and conducted applied, problem-oriented research on various areas of weed science.

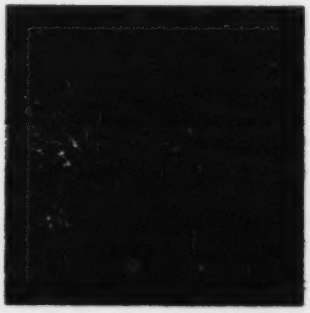
Staff diagnosed plant injury from herbicides and other agricultural chemicals using visual examination, bioassay and instrumental analysis. In cooperation with the Food Testing Laboratory of Alberta Agriculture and the AEC Chemistry Wing, 554 samples of suspected damage were processed. The work frequently involved determining if crop damage was due to herbicide drift, to misapplication of spray or to residues in the soil. Major herbicides causing damage were 2,4-D, MCPA, picloram, and dicamba; injured vegetation was 60 per cent vegetables and ornamental plants and only 30 percent cereals and oilseeds. The service was mainly for identifying and solving problems rather than providing information for litigation.

Other Section investigations showed that soil-applied wild oat herbicides, especially triallate and trifluralin, failed to control weeds or were blamed for damaging rotational crops such as barley and wheat. A dry, cool fall and early spring followed by a wet summer may be the primary cause of this problem. It appeared that breakdown of these herbicides was slow under these weather conditions. Herbicides in the soil were not active during the period of low moisture and low temperature; thus wild oats were not hurt during germination. However, these herbicides' activity increased during the warm, wet summer, causing crop injury or damage.

In response to increased demand for information on herbicide residues in soil, a new analytical technique was developed. It involved taking soil samples at depths of zero to 30 centimeters directly into a polyvinyl chloride tube. Biological assays using faba beans then determined herbicide residues. The technique was scheduled for use in a province-wide survey of picloram residues in soil in cooperation with Alberta Environment's Pesticide Chemicals Branch and Alberta Agriculture's Weed Control Branch.

The Section continued to emphasize the importance of correct identification of weeds for effective control. A permanent herbarium of weeds and other plants was therefore maintained to aid in identification. The Section also prepared photographic weed plates for identification and extension purposes. Plans were drawn up for a weed garden to include most common and potential weeds in Alberta, allowing identification at various growth stages. The Section's diagnostic service received and identified some 500 weed specimens during the year. Revised forms for plant identification were printed and supplied to field staff of municipalities and Alberta Agriculture.

The Section conducted a comprehensive research program testing herbicides for weed control and crop tolerance. In 1,376 test plots at AEC and across Alberta, the Section tackled questions on: control of volunteer crops which threaten to limit feasibility of minimum tillage practices; influence of herbicide residues on succeeding crops; and effects of wetting agents on herbicide efficacy and crop tolerance. Field data were submitted to the Research Appraisal and Planning Committee of the Expert Committee on Weeds (Western Canada). The information is used by Agriculture Canada for herbicide registration.



Entomology Section

Research near Mossleigh, Alberta, used pheromones (insect sex attractants) to predict Bertha armyworm outbreaks. A grid system of pheromone-baited traps was set up to try to relate moth capture to later larval infestations. Results showed that where 100 moths or more were caught per trap during the flight period there was a high larval outbreak potential in the area. Pheromone traps were set out throughout Alberta's canola areas and, based on moth capture, a larval outbreak was correctly forecast in southern Alberta.

Surveys were conducted to warn of any entry of elm bark beetles into Alberta. No European elm bark beetles were detected in southern Alberta in pheromone-baited sticky traps. Similarly, elm trap logs and sticky traps detected no native elm bark beetles. Both species are vectors of Dutch Elm disease.

Green peach aphids, vectors of potato leaf roll virus, were found in all potato fields surveyed except near Lacombe. Potato aphids increased on one seed farm near Brooks. Aster leafhoppers, vectors of aster yellow disease, were also found near Brooks. This survey was done for Alberta Agriculture's Seed Potato Improvement Program.

Field trials were conducted on candidate pest control products. One compared Dipel, cypermethrin, permethrin and fenvalerate with methomyl and methidathion for Bertha armyworm control. Based on larval death four days after treatment, candidate products equalled or surpassed the registered standards.

As well, liquid and powder seed treatments and granular insecticides were tested for protection of Altex canola seedlings against flea beetles. There was little difference in effectiveness and, on average, none kept seedling damage below 25 per cent.

Another trial evaluated the effect of a nutrient seed coating (Prill-On Seed Coating, OSECO) on effectiveness of Vitavax RS flowable and on plant establishment and yield. Canola plots treated with Vitavax and the coating suffered less flea beetle damage and showed better establishment and yield than untreated and uncoated canola.

In cooperation with other agencies, Section staff identified field crop and ornamental plant pest problems. Among reported cereal crop pests were English grain aphids, isolated outbreaks of army and red cutworms and grasshoppers, and blackbirds. A wheat sample from Vegreville contained wheat stem maggots.

Most canola growing areas had heavy crucifer and striped flea beetle outbreaks early in the season. Some fields were reseeded. As well, about 6000 hectares of canola were sprayed for Bertha armyworm control in southern Alberta.

Horticultural pests identified included tuber flea beetles which are increasing annually in Edmonton potato plantings. Flea beetles, spinach carrion beetle larvae, red-backed cutworms, root maggots and cabbageworms were common vegetable garden pests. Two-spotted spider mites caused problems in raspberry plantings.

Merchant grain beetles, larder beetles and large flour beetles were common pests of household stored products. Common nuisance pests were camel crickets, blade carpet beetles, carpenter ants, spiders and ground beetles.

In the Section's livestock research, excellent horn fly control was achieved using fenvalerate-impregnated ear tags on range cattle. Trials were conducted on six herds using one ear tag per animal on every second, third and fourth animal. Flies were eliminated from untagged animals pastured with tagged ones. Another trial evaluated cypermethrin applied through a self-treatment oiler for horn fly control. Very good control was achieved with low volumes of material.

A trial to test the efficacy of fenvalerate applied as a pour-on for cattle lice control gave excellent control of cattle chewing lice but no control of long-nosed cattle lice.

To assess the abundance and severity of cattle lice in Alberta, a preliminary survey of cattle herds was conducted in east-central Alberta. All herds had one or more infested animals although the incidence and severity was much lower in herds treated for lice. The most common species of lice was long-nosed sucking lice. Self-treatment oilers provided better control than pour-on products. All owners treated for cattle grubs.

Initial trials were conducted on permethrin for protection of cattle from black flies near Athabasca. Forced-use dust bags gave some relief but self-treatment oilers and mist applications to whole herds proved ineffective.

Staff also made extension/education presentations to colleges, producer groups and extension workers, used television, radio and newspapers to spread information on insect pests to producers, and helped Regional Crops Laboratories with diagnosis and information services. Some 597 insect diagnoses were performed. Pests of households and ornamental plants comprised the largest group of submissions.

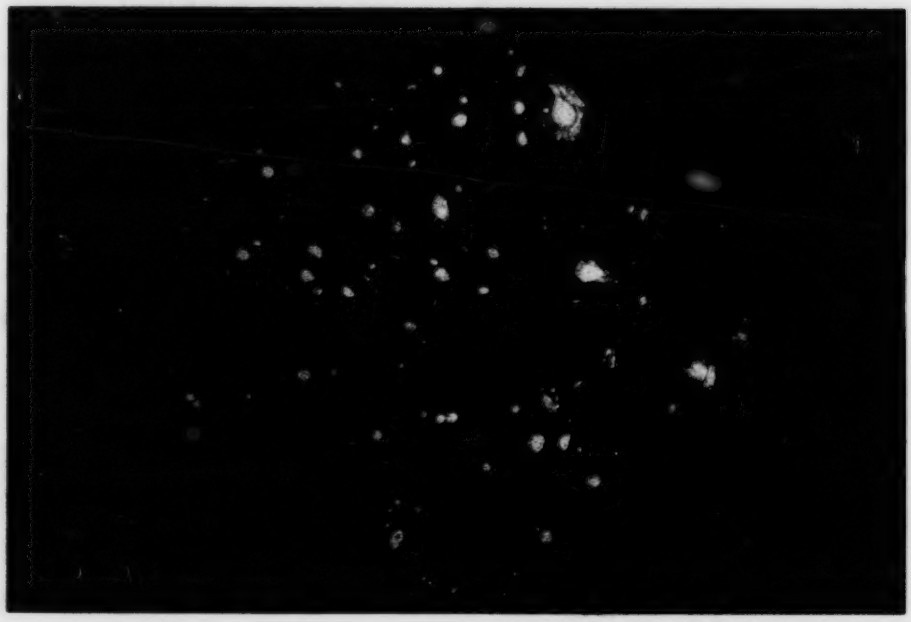
Plant Pathology Section

The Plant Pathology Section maintained a disease diagnostic and extension service which processed 931 submissions. Diseased specimens of cereal, oilseed, ornamental, vegetable and fruit crops were submitted by farmers and commercial greenhouses as well as by amateur growers.

Among noteworthy diseases identified were white rot of onions and clubroot of crucifers, which were diagnosed for the first time in Alberta. Both diseases are soil-borne and are potentially destructive to their hosts. There was evidence of an increase in the incidence of head melanosis of wheat. The disease was quite severe on the cultivar "Park" and caused up to 50 per cent reduction in grain yield in certain fields. Fireblight of apples, mountain ash, and crab apples, which caused problems in urban areas in the past, was uncommon in 1980.

The Section participated in several province-wide surveys in cooperation with other federal, provincial and university pathologists. Verticillium wilt of alfalfa, which has been detected in irrigated fields in southern Alberta and is quite widespread in British Columbia, was not found in northern or central regions of Alberta. The virulent strain of the blackleg fungus was not found in commercial canola fields. This disease is already widespread in Saskatchewan, and was identified at several new locations in that province during 1980.

An active program of extension and public information was maintained with staff participating in seminars and pest control courses to farmers and agriculturists. Several disease control bulletins for public information were also written.



CHEMISTRY WING

Chemistry Wing

In many respects, problems of the environment are problems of a chemical nature. Metals appear in animal tissue; unusual compounds appear in the atmosphere; pesticides accumulate in lake bottom sediments. Chemicals from man-made and natural sources move in complex cycles, some harming the environment in ways not always fully understood, while others are beneficial or even necessary for life. The Chemistry Wing of the Alberta Environmental Centre has as its major job the analysis, understanding and explanation of chemical aspects of the environment. It provides the techniques needed to gather analytical data necessary to understand these complex subjects. The Wing incorporated the functions of the province's former Pollution Control Laboratory, which was transferred to Vegreville in 1980.

To fulfill its objectives, the Wing is organized into Sections, each with its own specialty but each part of an integrated thrust providing service, research and development work. As its major role, the Wing annually analyzes thousands of samples of air, water and other materials, for hundreds of thousands of constituents. The Wing also conducts work in the field of microbiology.

During the past year, Chemistry Wing work was carried out in support of monitoring, pollution emergency response, and testing and research work by Alberta government agencies as well as for internal AEC programs. Most programs and projects at AEC depend on some input from the Chemistry Wing.

Air Analysis and Research Section

Investigation of aspects of the complex and increasingly controversial subject of acid rain is one of the functions of the Air Analysis and Research Section. The phenomenon can occur when chemicals are washed from the air in the form of precipitation and are carried to lakes, rivers and the ground.

Section members analyzed samples from a number of precipitation monitoring stations throughout Alberta. Samples were tested for acidity and content of sulphates, nitrates and other substances as a part of studies to determine possible changes in the air and water systems of the province. A joint project was undertaken with Alberta Environment, to collect and analyse a large number of rain samples from the Fort McMurray tar sands area. These "baseline studies" were designed to gather basic information about the potential for acid rain in north-east Alberta.

This Section provided the data needed for constant monitoring of air quality trends in Alberta. Two major pollutants, hydrogen sulphide and sulphur dioxide, were collected at some 300 monitoring stations throughout Alberta for analysis in AEC's laboratories.

Special tests were done on urban air sheds, with emphasis on detecting the presence of heavy metals like lead, and the carcinogenic chemical benzo(a) pyrene. Work was also done to detect the presence of special chemicals like vinyl chloride at the parts per billion level in the workplace and in the atmosphere. Analyses were performed on samples collected from 16 high-volume sampling stations in major urban centres.

The Section is also equipped to analyse odor-causing volatile compounds such as benzene, xylenes, and ketones. Staff supported Alberta Environment's air emission control and licencing programs with analyses of emissions from fertilizers, chemical, cement and other industrial plants. In all, during the year the Section processed more than 5,000 ambient air and precipitation samples for over 10,000 parameters. The Section developed new methods and updated existing ones for analyzing air pollutants such as benzo(a) pyrene, vinyl chloride and sulphur dioxide. The Section also performed some soil and vegetation analyses.

Water Analysis and Research Section

Water - nature's nearest equivalent to a universal solvent - is a frequent recipient of pollution from man-made and natural sources, with potentially serious long-range effects. The Water Analysis and Research Section provides the data and knowledge needed to identify pollutants and to chart trends in water quality.

Some of the Section's work - testing of drinking water, for example - has direct and immediate implications for human health. Mainly as a service to Provincial Health Units, the Section analyzed some 12,000 water samples for 160,000 constituents during the year, to determine if drinking water standards were met and what treatment might be required to attain acceptable quality. Other water testing was carried out in support of AEC, fisheries, municipal engineering and water resources activities.

The Section also conducted extensive testing in support of Alberta Environment and Alberta Energy and Natural Resources monitoring and control programs. Samples from rivers, lakes, municipal water supplies, sewage treatment plants and industrial effluents were analyzed for up to 67 water quality parameters.

Section staff also participated in lake nutrient studies; these involved intensive monitoring of nutrient levels present in Alberta lakes, including concentrations in streams entering and leaving these lakes. Particular attention was focused on phosphorus, an element whose role in lake ecology is the subject of controversy.

The chemical analysis capability of the Section was increasingly used within the Centre in support of other AEC research and development programs.

Work also progressed on development of laboratory procedures to allow detection of lower levels of substances such as nitrogen and phosphorus in water. This increased sensitivity is required to allow scientists to define environmental trends more accurately and to discover small changes in pollutant levels which may have the potential to produce major ecological changes in the future.

Quality Control and Data Management Section

This Section moved toward implementation of its mandate to provide quality control and to evaluate performance of the analytical systems operating in the Chemistry Wing.

The Section also has a mandate to provide for the automation and computerization of the Chemistry Wing. Currently, the Section provides reports for the other Sections of the Chemistry Wing for distribution to groups which use the Wing's services. While the present computer system relies upon manual data entry, plans were drawn up to capture data directly from the analytical instruments.

Microbiology Section

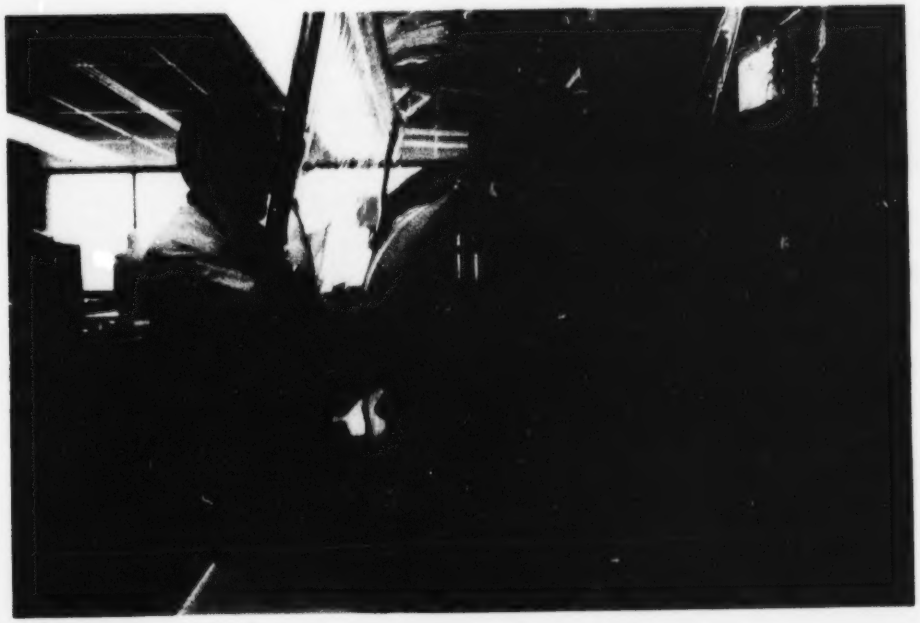
Microorganisms, because of their nature and diversity, affect most facets of human affairs. In nature, they recycle elements in air, water and soil, and degrade materials such as wood, but they also can cause problems for plants, animals and man. The Microbiology Section provides services and generates knowledge about microorganisms and their role in environmental pollution and management.

This newly-created Section established a microbiological identification service which, outside of medically important bacteria collections, is unique in Alberta. After initial standardization using reference cultures, microbial identification was provided to support AEC research and service programs. Identification was carried out with a 16-test rapid series followed by computer analysis of test results.

The Section also began work on an inexpensive, rapid and sensitive microbial test to determine the toxicity of certain chemicals and effluents reaching land and water. The test involves measuring the decrease in light produced from a luminescent bacterium when it is challenged with a toxicant. Another key area of work was basic research on the use of bacteria for the removal of chromium, a very toxic metal, from sewage effluent. This has potential for clean-up of sewage effluents to render them chromium free and acceptable for land application.

Section staff started preliminary work on the microbiological aspects of cattle feedlot wastes, a potential pollutant 60 times the volume of human wastes on a per head basis. A literature search was initiated to compile a bibliography dealing with the various areas of the cattle feedlot industry. A further and very significant area of research concerned the use of Alberta's immense Aspen poplar resource. Previous work at AEC and other institutions indicated poplar may be a very suitable source of cellulose from which sugar syrups, inexpensive animal feed, enzymes and chemical feedstocks can be produced through biological processes.

Experiments were also conducted to test suitability of various equipment and processes for the Section and AEC uses. For example, comparisons of manual and electronic bacterial plate counting showed little difference between the methods, suggesting the counter will be of great value in handling large numbers of samples.



Research Services and Methods Development Section

Synthetic and natural organic compounds have brought immense social and economic benefits to mankind. However, certain of these chemicals can pose a serious threat to human health if they find their way into the environment. A major activity of this Section is to develop methodologies to detect trace levels of organic compounds in various matrices, and to provide analytical data on such samples.

During the year staff in the Section developed a number of methods for trace analysis of environmentally-important pesticides and organic contaminants including difenzoquat, diuron, lindane and pyramine in water, soil, and sediments.

The Section carried out extensive work in analyzing for more than 85 pesticides and other organic contaminants in drinking water, river water, industrial discharges and soil sediments. A major responsibility of the Section is providing an emergency analysis service to analyze the constituents of chemical spills.

ANIMAL SCIENCES WING

Animal Sciences Wing

The primary area of expertise and responsibility of this Wing is the effects of environmental changes on man and other animals. The term "animal" is used in its broadest zoological sense and includes all species from lower single cell animals, insects, and fish, to large animals and man.

The Wing Head was appointed in April, 1978. Over the next several years research requests of participating Departments were reviewed and an organization designed to address those requests. A staffing plan was developed, senior scientists recruited, budgets established, laboratory space developed, specifications for major laboratory instruments and equipment prepared and a research program blocked out.

The Wing does not have a major diagnostic, analytical or extension responsibility. However, two minor service responsibilities were transferred to the Wing in 1979 from other Departments. These are the Diagnostic and Field Investigative Service for Problem Wildlife, transferred from the Plant Industry Division of Alberta Agriculture, and Industrial Effluent Monitoring, transferred from Alberta Environment's Pollution Control Division. Maintenance of these transferred service responsibilities has first call on Wing resources.

Other service responsibilities include providing support required for research programs such as the Water Treatment Plant and Laboratory Animal Care Services, providing miscellaneous consulting and other ad hoc services to participating Departments and the public, major facilities development, and new program and project development.

Research efforts of the Wing are divided into two main program areas. These are: a) the effects of environmental changes on living natural resources (fish and wildlife); and, b) environmental toxicology. In the first area, many of the changes are physical, arising from large projects using renewable and non-renewable natural resources. In the second area, the emphasis is on effects of potentially toxic substances, of natural or man-made origin, being released as emissions into the air, as effluents into water systems or as deposits in or on land.

In all the Wing sustains eight service programs and twelve research programs. Some programs are fully active, others are at the implementation stage, while still others represent near- or intermediate-term planning.

The Wing consists of five research-oriented Groups plus an Administrative and Management Group. The research Groups are Aquatic Biology, Wildlife Biology, Pathology, Toxicology, and Clinical Investigation.

Administration and Management Group

The Administration and Management Group provided overall direction and coordination of Wing activities, liaison with other Groups and Wings, and administrative and clerical support. In addition, it provided necessary research support such as experimental design and statistical analysis services.

Through the Site Support Services Section, the Group also provided as a service and responsibility to the Centre for the development and operation of the 300-hectare site. This included allocation of the site for research purposes, maintenance of research plots, park design and development, internal roadways, fencing, utilities supply, external livestock facilities, vehicle and equipment service and similar functions.

The Site Support Services Section completed plans for a detailed soil survey to gather data to be used in conjunction with aerial surveys to determine site characteristics and the best land use pattern. More than a mile of three- and four- row shelterbelts was established, as was a tree nursery. In co-operation with Environment Canada, a climatological station was established, with the first readings taken in November. Planning continued for a public park on site, featuring many native trees, shrubs and grasses and perhaps ornamentals and fruit trees.

The Administration and Management Group includes Administrative Services, Research Support Services and Site Support Services Sections.

Pathology Group

The Pathology Group participates in and provides services to all programs and projects which require evaluation of morphologic and biochemical alterations resulting from environmental changes, of naturally-occurring or experimentally-induced origin. Specifically the Group undertook gross pathologic evaluation of experimental animals, histologic and histochemical preparation, histopathologic and ultrastructural evaluation of tissues and haematologic and clinical biochemistry analyses. As the Group develops further it will also lead some Wing and Centre programs which are planned but not yet active.

The Pathology Group includes Necropsy, Histopathology and Clinical Pathology Sections.

Aquatic Biology Group

The Aquatic Biology Group is responsible for research and service activities relating to the effects of environmental changes in water systems, and water quality for industrial, agricultural and recreational uses and human consumption.

The Group implemented several projects to determine the source and fate of man-made chemicals in lakes and rivers in Alberta. Initial investigations included a survey of contaminants in fish collected from priority areas throughout the province.

Three compounds; methyl mercury, polychlorinated biphenyls, and phthalate acid esters occurred in all tissues, whereas lipophilic organo-chlorine pesticides were generally restricted to fat deposits. In most instances, high residues could be related to deposits made at an earlier time rather than to current waste disposal methods.

Acute lethality tests were conducted on effluents from major industries throughout Alberta. Ninety percent of the industries met effluent licences and guidelines. In cases of non-compliance, staff from Alberta Environment reviewed and re-evaluated waste treatment methods.

Preliminary work began on several other research projects. These included an evaluation of the toxic properties of contaminated bottom sediments on aquatic organisms, and the development of a list of sources of mutagenic chemicals in receiving waters in Alberta. There was a successful evaluation of the use of histologic changes in fish tissues as an aid in biomonitoring. This will develop further as a new tool to assess effluent from different industries.

Planning and development work continued for the installation of the Water Treatment Plant. This system will produce approximately 455 litres per minute of secondarily treated water for distribution to laboratories throughout AEC. The plant should become operational during late 1982.

The Aquatic Biology Group includes Aquatic Bioassay, Limnology and Aquatic Ecology Sections.

Wildlife Biology Group

The Wildlife Biology Group is responsible for examining environmental circumstances which could have broad implications for native wildlife throughout Alberta.

Priority areas of research are: vulnerable or sensitive species such as grizzly bears and cougars; animals in high recreational demand such as moose; problem wildlife; and commercially important animals such as furbearers. A primary impetus for initiating studies is a major planned land use change which could cause chemical or physical alterations of important existing habitat.

One of the first major long-term projects developed was an investigation of the effects on grizzly bears of a major new timber harvesting development in the Berland River area. A program of live trapping, radio-tracking and laboratory study was begun to determine how land use in forest habitats affects bear populations. The grizzly bear study concentrated on an area scheduled for logging and other developments over the next 20 years. Initial research was aimed at collecting basic biological information about the bears, and establishing baseline data which will allow predictions about how developments may affect the animals. Extensive tests on age, blood chemistry, productivity, and other factors were carried out. On a weekly basis, bears were tracked by way of radio-collar transmitters. Information collected could affect management decisions for decades.

In a project in the Swan Hills area, AEC staff members began studying habitat selection by moose to determine how closely animal distribution was related to browse quality. AEC co-operated with the Fish and Wildlife Division of Alberta Energy and Natural Resources in this study of typical moose habitat which is being affected by hunting, logging and oil and gas activity.

In cooperation with Elk Island National Park, AEC began conducting regular physical examinations of moose carcasses. Researchers accumulated valuable information about the animals' seasonal condition cycle, knowledge of which promises to be an important tool in wildlife management.

The Group also developed plans for a system of wildlife study facilities, including an animal holding and research unit at AEC for detailed studies and testing, and a fenced field facility allowing study of animals in a near-natural environment.

The Problem Wildlife Program deals with vertebrate pests of agricultural concern such as coyotes and pocket gophers. A study of pocket gopher control, conducted with the aid of implanted transmitters, determined that using 2,4-D to remove broad-leaved plants from pastures helped control the pocket gopher population by removing their food supply. Further studies were conducted on control of pocket gopher numbers by removal of their food from headlands around fields.

Staff completed studies on the population of coyotes and population ecology, and range relationships of pronghorn antelope in Alberta. As well, staff evaluated the use of a helicopter-mounted net gun for the capture of wild game. This technique, new to North America, was effective in the capture of antelope, mule deer, white-tailed deer, caribou and wild sheep.

The Wildlife Biology Group is composed of Wildlife Ecology, Environmental Physiology and Problem Wildlife Sections.

Clinical Investigation Wing

The Clinical Investigation Group participates in and provides services to all programs and projects which require the use of experimental animals, experimental surgery, extensive field studies of domestic animals, nutritional formulation and analyses, and epidemiologic evaluation of the effects of environmental changes. In the current year only the Nutrition Section was activated; the remainder of the Group will be activated in 1981-82.

Work included development of a nutritional analyses and consulting service for programs using experimental animals, and planning an experimental feed mill to allow controlled formulation of maintenance and experimental diets. Plans were made to commission laboratory animal holding facilities and to design major separate animal housing facilities.

The Clinical Investigation Group is composed of Nutrition, Laboratory Animal Services, and Epidemiology and Field Investigation Sections.

Toxicology Group

Toxicology is the study of adverse effects produced in living organisms by chemicals of natural or man-made origin. In addition to describing the adverse effects, toxicology also seeks to understand the mechanism of action of the toxic chemical and to predict possible effects at different doses or in different species. Frequently such investigations require interdisciplinary cooperation between researchers in both biological and physical sciences.

The Toxicology Group has research commitments to several Centre programs. These include: potential effects of sulphur-containing emissions on livestock; the study of inhaled gases, vapours, particulates and aerosols; toxicology of biocides; identification of priority pollutants for Alberta; chemical safety evaluation; toxicology of petrochemicals and fossil fuels; and genetic toxicology. In addition the Group provides information and consulting services for ad hoc toxicologic problems.

During 1980-81 the Group undertook initial staffing and equipping of interim laboratory space and participated in intensive planning of the research program. Particular emphasis was placed on the inhalation toxicology program. Pilot field studies were begun to test experimental approaches to potential effects of sulphur emissions on domestic livestock.

The Toxicology Group is composed of the Environmental Toxicology, Inhalation Toxicology and Veterinary Toxicology Sections.

ENVIRONMENTAL TECHNOLOGY WING

Environmental Technology Wing

The mandate of this Wing is to study techniques of environmental control, to develop methods which can be applied to solve practical environmental problems, and to provide specialist services. Generally, the Wing's activities are organized into three areas - water quality improvement research, solid waste management research, and special services.

The Wing is organized into two major Groups: Process Evaluation, which examines on a laboratory scale those physical, chemical and biological processes which appear promising for environmental control; and Operations, responsible for pilot plant testing and field application of those techniques which show potential for development.

Because it will apply technology to solve problems uncovered to a large extent by other Wings, the Environmental Technology Wing was deliberately planned for development about a year behind most of the Centre. Major activities of the Wing were therefore concerned with staffing, equipment purchasing, and program planning. In addition, the Wing began meeting its mandate to provide special services, both to AEC (for example, site environmental services) and to other government agencies.

Site Environmental Services

Site services at AEC were established on the principle that Centre operations and activities should be environmentally sound as well as functional.

Among the activities where the Environmental Technology Wing took the lead was in the planning and design of a liquid waste handling system. This system includes four essential components: a normal sanitary sewer; a special storm drain system engineered to help AEC save runoff water; a herbicide and pesticide waste storage system; and a laboratory water treatment and waste lagoon storage system.

Plans were developed for the storm system which will deliver runoff water to a pond on the AEC site. As well as providing a central point for construction of a future public park, water saved in this way will be used for purposes such as sprinkling lawns.

The laboratory waste water treatment system is comprised of a physical/ chemical treatment plant and a storage lagoon for wastes that resist immediate treatment. A triple-membrane containment system with in-place monitoring was included in the lagoon design.

The Wing also designed a water treatment system using a reverse osmosis process to upgrade local supplies to the high standards of purity required for Centre laboratory purposes. The process uses pressure to force water across a membrane, leaving behind salts and other impurities.

The Environmental Technology Wing was also active in the development of a water treatment and recycle system for use in aquatic biology studies.

Operations Group

Two Sections - Pilot Plant Operations and Instrumentation and Controls - make up this Group.

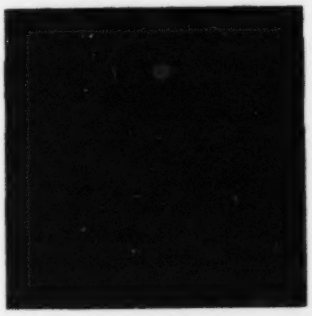
The Pilot Plant Operations Section began setting up the organization and equipment needed to test promising environment control processes. Planning centered on programs which will operate and test scaled-down models of the type of equipment which would have to be used in normal industrial settings; for example, pilot-scale municipal waste treatment systems. These prototype situations are aimed at simulating field conditions and providing knowledge about those processes and systems which hold promise for successful development and application.

Work at AEC relies on sophisticated equipment and instruments which require advanced, specialized knowledge to operate and maintain. The Instrumentation and Controls Section was established during the year to service, maintain and repair this equipment, and also to develop specialized instruments not available commercially but vital to AEC programs.

One of the early projects to emerge from the Section's electronics workshop was a bear trap beacon constructed to assist in the Animal Sciences Wing's studies on grizzly bears. The beacons signal reconnaisance planes that traps have been sprung. Sixty of these devices were made.

For the Centre's fish holding area, work started on a lighting system designed to mimic natural outdoor lighting conditions. A further project was the design of a control panel to monitor performance of the Centre's water treatment system.

A major portion of the Section's activity was geared toward developing skills and instruments needed to service the Centre's scientific equipment.



Process Evaluation Group

The Process Evaluation Group has three sections: Physical/Chemical Processes; Biological Processes; and Geochronology.

The first two made major progress in staffing, equipment purchases and program development during the year, while the Geochronology Section advanced to the stage where it began carrying out its research and service work.

The Physical/Chemical Processes Section is concerned with processes which may be useful as techniques of pollution abatement. Plans were drawn up for research directed toward gaining a basic understanding of processes which occur in specific environments such as municipal waste, wastewater and land reclamation sites. Approaches which show promise of being technically feasible and economically sound will, if appropriate, be taken from a laboratory to a pilot plant scale where the theories will be put to the practical test.

The Biological Processes Evaluation Section applies biological solutions to environmental problems. Usually, these are microbiological methods brought to bear on specific waste problems. The Section conducted a review of the scientific literature on solid waste disposal in sanitary landfills. In co-operation with other scientists at AEC and Alberta Environment, the Section organized and conducted a workshop to review the state of knowledge and establish research needs for this subject. AEC staff members presented a paper on the microbiological processes within a landfill site, and the workshop addressed concerns such as production of explosive gases and water pollutants from landfill sites.

The Section also started investigations into a new fermentation technique using microbial action to convert waste materials into useful products. One possibility is to convert straw or Aspen Wood into animal feed, a prospect examined jointly with staff from the Chemistry Wing. These techniques present the potential both for reducing the mass of straw and wood wastes and for producing useful products for the cattle industry.

Establishment of the Geochronology Section gave Alberta its first isotope geochronology facility, a laboratory with capabilities equal to any in the country and with equipment rare in North America. It includes both radiocarbon dating and tritium analysis capabilities.

The radiocarbon dating component of the Section was developed to allow determination of the age of materials as old as 40,000 years. The tritium analysis component will use water as a natural tracer. These scientific techniques were developed with several uses in mind. They can aid community planning by supplying an understanding of groundwater availability. In archaeology, radiocarbon dating will determine the age of ancient artifacts and settlements. Geologists can date materials for information on erosion rates, the chronology of glacial events and the ages of soils.

A major Geochronology Section accomplishment during the year was the installation of detection equipment which will make the laboratory unique in Canada. Two of the major instruments developed were liquid scintillator counters to measure the activity of carbon and tritium. One is designed for low- to medium- activity samples, while the second, the Noakes counter, is capable of detecting very low levels of naturally-occurring radioisotopes; it is therefore particularly useful in natural environment applications.

Further progress on instrumentation included development of an Ostlund electrolysis system for tritium enrichment in water samples.

COMMON SERVICES WING

Common Services Wing

This Wing provides the administrative and commonly-used technical support services required by all Centre staff. Activities included compilation and financial administration of the Centre's $6-million budget, recruitment, pay of Centre staff, purchasing, stores, public relations and communications, and operation of the AEC Library.

In addition to developing and implementing office systems and procedures necessary for efficient Centre operations, a major Wing activity was recruitment of Common Services staff. At year's end, 31 people were employed in the Wing, approximately double the number a year earlier.

Financial Services Section

Funds for AEC operations are allocated by a separate vote of the Legislature within the Department of Environment budget.

During the past fiscal year, spending totalled $6,010,454, including $2,674,200 on manpower, $1,348,475 on supplies and services, and $1,984,477 on fixed assets. An additional $3,300 was awarded in bursaries for students at technology institutes and community colleges.

The Section assisted in the preparation and administration of the AEC budget and budget documents. Staff compiled two budgets: a financial budget for submission to Treasury Board and the Legislature; and a project-based budget for the AEC Board of Directors. Section staff were required to monitor budget expenditures.

Specialized units were developed to handle accounts receivable and accounts payable, to provide a central duplicating service, and to receive and monitor purchases. Over 5,000 invoices were processed. A stock control and inventory system was also implemented, and over 1,500 purchases and acquisition proposals were processed.

1980 - 1981 FISCAL YEAR — AEC

Expenditures:

	Manpower	Supplies & Services	Grants	Fixed Assets	TOTAL
Program Support	581257.90	500786.65	3300.00	239349.19	1324693.74
Plant Sciences	380890.25	100352.12	—	110483.44	591725.81
Chemistry	943396.44	377125.74	—	677706.30	1998228.48
Animal Sciences	54233.08	231103.85	—	535224.83	1311561.76
Envir. Tech.	223422.90	139107.34	—	421714.07	784244.31
TOTAL	2674200.57	1348475.70	3300.00	1984477.83	6010454.10

(This is not an audited statement.)

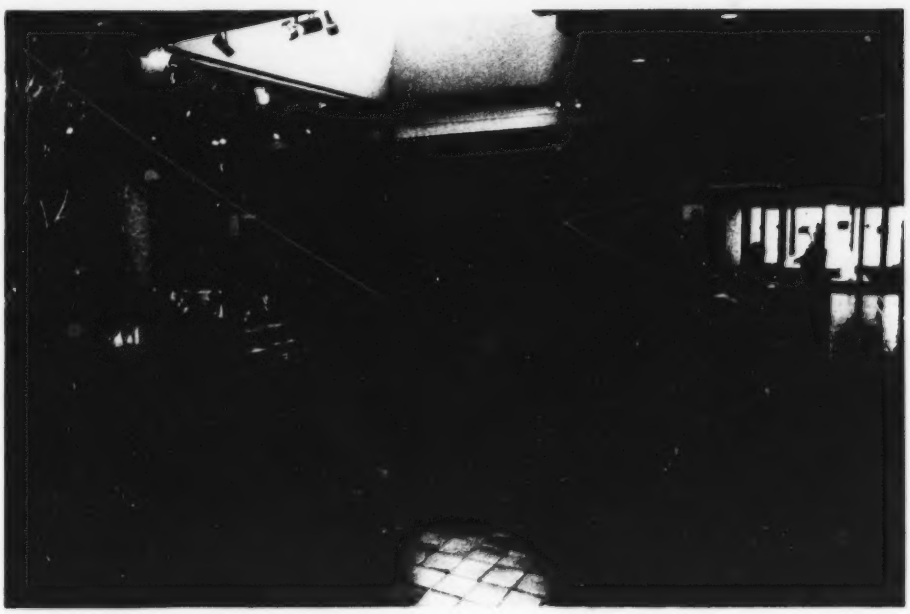
Personnel Section

In the recruitment area, a number of scientists and technicians were hired to fill key positions. A personnel administrator assumed responsibility for the on-going recruitment of professional, technical and clerical staff.

At the fiscal year end, the number of AEC staff reached a new high of 158 including 111 permanent positions. The list of permanent employees included 43 professionals, 44 technicians, and 23 clerical and other workers. As well, there were 24 part-time and temporary employees. A contingent of Alberta Department of Government Services workers was stationed in the Centre to be responsible for operation and maintenance of the physical plant. Of the 158 staff members, 65 were living in Vegreville and area when hired.

With growth in staff numbers, staff training and development took on increasing importance. Staff members participated in both internally- and externally-delivered courses. Training for safe operation of laboratories was emphasized with courses offered including Chemical Safety in Laboratories, Safety for Supervisors, Defensive Driving, and Fire Extinguisher Training.

An orientation program was started to introduce all new employees to AEC's structure, activities, goals and procedures.



Communications Section

This Section was created to help provide information about the activities and goals of AEC to a wide range of groups including high school, technical and university students and the general public. Initial emphasis was on developing good relations between AEC and the Town of Vegreville. A community relations program continued its efforts to smooth relations between the town and incoming AEC employees.

The Centre published a newsletter featuring information about the town and the Centre. It was distributed to AEC staff, townspeople, and other interested groups and individuals.

The year saw AEC start to attract increasing numbers of visitors, especially scientific, community and school groups.

Scientists from across Canada, the U.S.A. and overseas visited to observe and in a few cases to participate in AEC work. AEC scientists organized special events for both scientists and laymen, including a workshop on sanitary landfill research, several technical seminars and a pest control course for agricultural extension workers.

AEC took part in an international student exchange sponsored by the Canada World Youth Organization. Two pairs of students, each including one Canadian and one Indonesian, worked at AEC for nine weeks before leaving for Indonesia for a similar experience. During the exchange, the Indonesian Ambassador to Canada visited the Centre.

Information Services Section

This Section includes operations of the Library, the Central Records Office, and the Mail Room.

The Library became fully operational with a collection consisting of films and transparencies, approximately 6,500 monographs in microform and hard copy, and over 500 journal subscriptions. Most of the monographs and journals are highly technical, reflecting the specialized nature of AEC's programs.

AEC's Library began using the U.S. Library of Congress alphanumeric system to classify books, and utilizing an automated catalog support service, the University of Toronto Library Automation Systems. This support service was also used for the production of AEC's Library catalog on microfiche, for document verification and for interlibrary loan locations.

Reference services offered included extensive computerized database and manual searches followed by document delivery from libraries all over North America. These reprints were maintained in a library file and were accessed by a manual or online keyword index. The Library filled approximately 300 interlibrary loan requests per month.

The Library maintained two inventories of environmental research in Alberta. A detailed information index was entered on a computer at the Canadian Plains Research Centre in Regina, and was available to other workers online through QL Systems. An abbreviated inventory, entitled "Persons Involved in Environmental Research in Alberta", was published during the year.

The Central Records office developed and implemented classification and numbering schemes for all AEC correspondence and documents. Records staff and Wing secretaries developed consistent indexing and classification of AEC files. Plans were drawn up to mount an extensive subject card index on a computer database with the object of having files eventually searchable on line, and printed keyword subjects and author indexes available to the Wings.

The Centre's Mail Room was staffed and organized to handle receipt and dispatch of both interdepartmental and external mail, and to begin mail pickup and delivery for each Wing.

ALBERTA ENVIRONMENTAL CENTRE PROJECTS

NAME	PRINCIPALS AND COOPERATING DEPARTMENTS
Plant Sciences	
Insect Diagnostic and Extension Service	Agriculture, Health Units, Environment
Ornamental Insect Pest Management	Agriculture, Outside Agencies
Field Crop Insect Pests	Agriculture, Environment, University of Alberta
Livestock Insect Pest Management	Agriculture, Environment,
Plant Disease Diagnostic and Extension Service	Agriculture, Outside Agencies
Applied Research on Diseases of Forages, Cereals and Oilseed Crops	Agriculture
Applied Research on Environmental Plant Pathology	Agriculture
Weed Science Diagnostic and Extension Service	Agriculture, Environment, Energy and Natural Resources, Recreation and Parks
Herbicide and Weed Control	Agriculture, Environment
Biology and Ecology of Weeds	Agriculture, Energy and Natural Resources
Biological Control of Weeds	Agriculture, Environment
Greenhouse and Growth Room Support	AEC
Revegetation and Reclamation	Agriculture, Environment, Energy and Natural Resources, Recreation and Parks
Chemistry	
Precipitation Studies (Air)	Environment, Alberta Research Council, Agriculture
Routine Services (Air)	Environment, Agriculture, Energy and Natural Resources, Health Units
Routine Services (Water)	Environment, Alberta Research Council, Agriculture, Energy and Natural Resources, Health Units, AEC
Research Services	AEC
Pesticide Analysis	Environment, Energy and Natural Resources, AEC, Health Units
Pesticide Methods Development	Environment, AEC
Trace Organic Analysis and Methods Development	Environment, Energy and Natural Resources, AEC, Health
Microbiological Identification Services	AEC, Provincial Health Laboratory
Feedlot Wastes and Waste Management	Agriculture, Environment, AEC
Toxic Wastes and Microbial Metabolism	Environment, AEC
Quality Control and Data Management	AEC
Technical Services	AEC
Lake Nutrients Water Analysis and Research	Environment
Animal Sciences	
Aquatic Biology Services	AEC
Aquatic Toxicology	Energy and Natural Resources, Environment, Agriculture

ALBERTA ENVIRONMENTAL CENTRE PROJECTS

NAME	PRINCIPALS AND COOPERATING DEPARTMENTS
Animal Sciences	
Aquatic Habitat Studies	Energy and Natural Resources, Environment
Environmental Chemistry of Wastewater	Energy and Natural Resources, Environment
Major Facilities Planning	AEC
Physiological Effects of Environmental Perturbations	Environment, Agriculture
Forest Management-Wildlife Interactions	Energy and Natural Resources
Problem Wildlife	Agriculture, Energy and Natural Resources
Furbearer Research	Energy and Natural Resources, Environment
Wildlife Biology Services	AEC, Energy and Natural Resources
Pathology Services	AEC
Effects of Environmental Sulphur	Environment, Agriculture
Inhalation Toxicology	Workers' Health, Safety and Compensation, Energy and Natural Resources, Environment, Agriculture
Nutrition Services	AEC
Toxicology of Petrochemicals and Fossil Fuels	Agriculture, Environment, Energy and Natural Resources
Toxicology of Pesticides	Agriculture, Environment, Energy and Natural Resources, Alberta Research Council
Chemical Safety Evaluation	Agriculture, Environment, Energy and Natural Resources, Workers' Health, Compensation and Safety, Alberta Research Council
Toxicology Services	AEC
Livestock and Laboratory Animal Services	AEC
Ecotoxicology	Agriculture, Environment, Energy and Natural Resources, Alberta Research Council
Interdisciplinary Biological Monitoring	Agriculture, Environment, Energy and Natural Resources, Alberta Research Council
Ecological Field Studies	Agriculture, Environment, Energy and Natural Resources, Alberta Research Council
Environmental Technology	
Geochronology Services	Alberta Research Council, Agriculture, Environment, Alberta Archaeological Survey
Site Environmental Control Services	AEC
Instrumentation Services	AEC
Solid Wastes Management Research	Environment, Agriculture, Energy and Natural Resources, Alberta Research Council
Water Quality Improvement	Environment, Agriculture, Alberta Research Council, Energy and Natural Resources

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*At March 31, 1981

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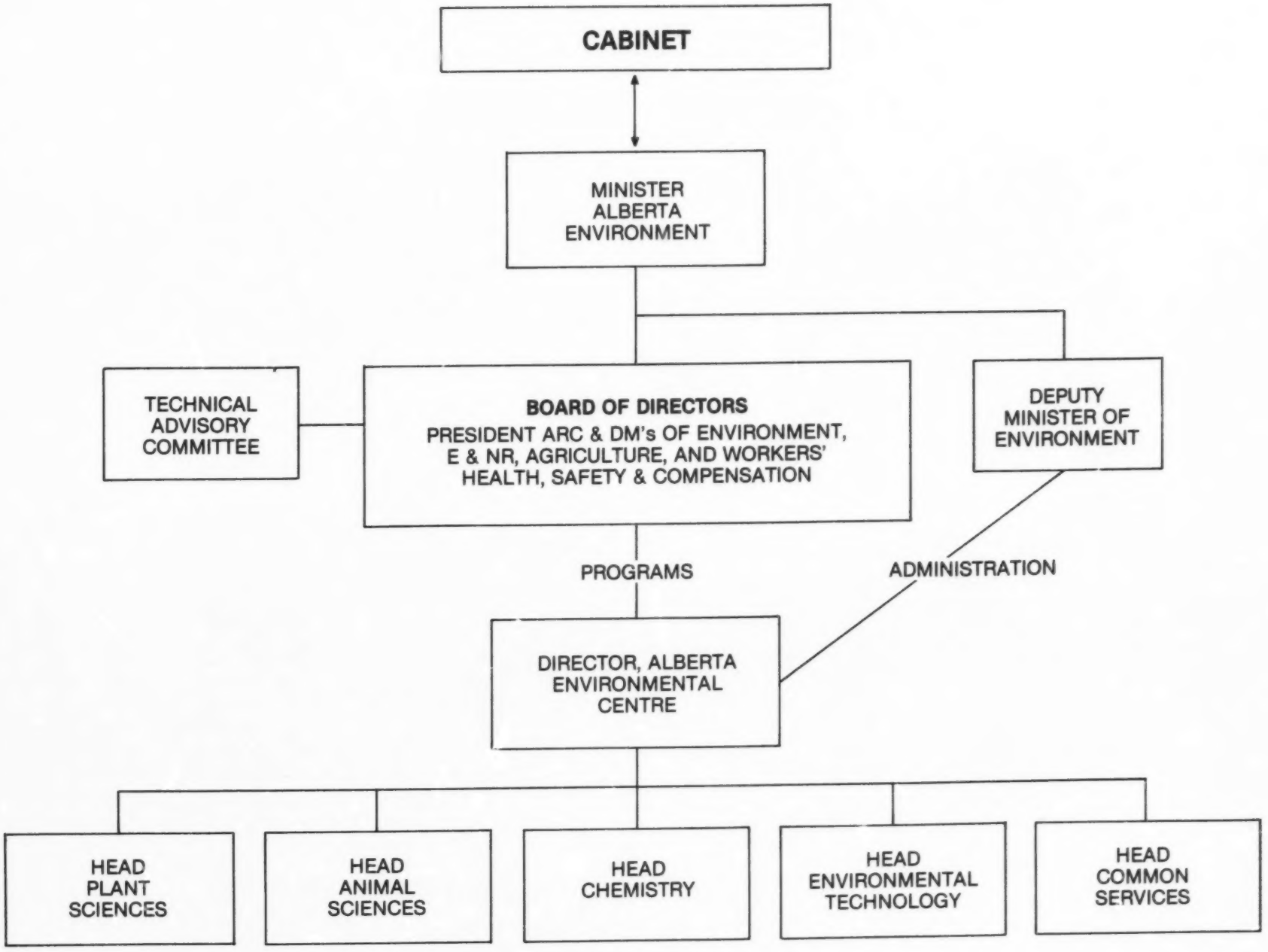
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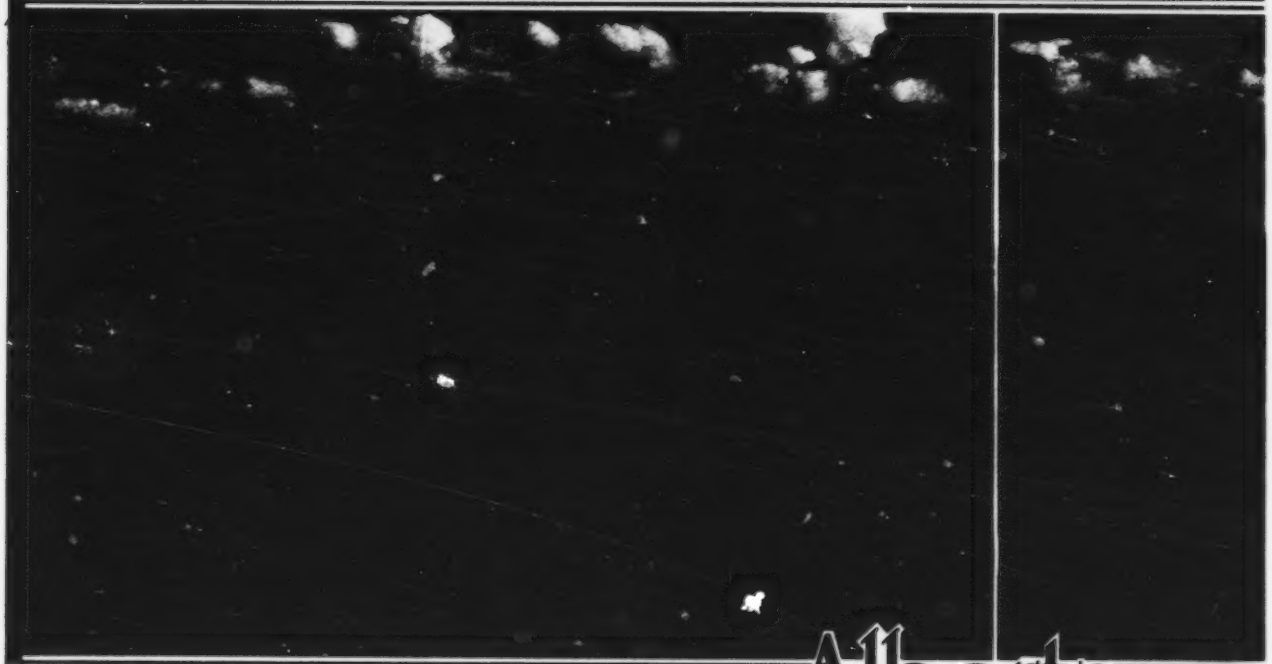


Alberta Environmental Centre

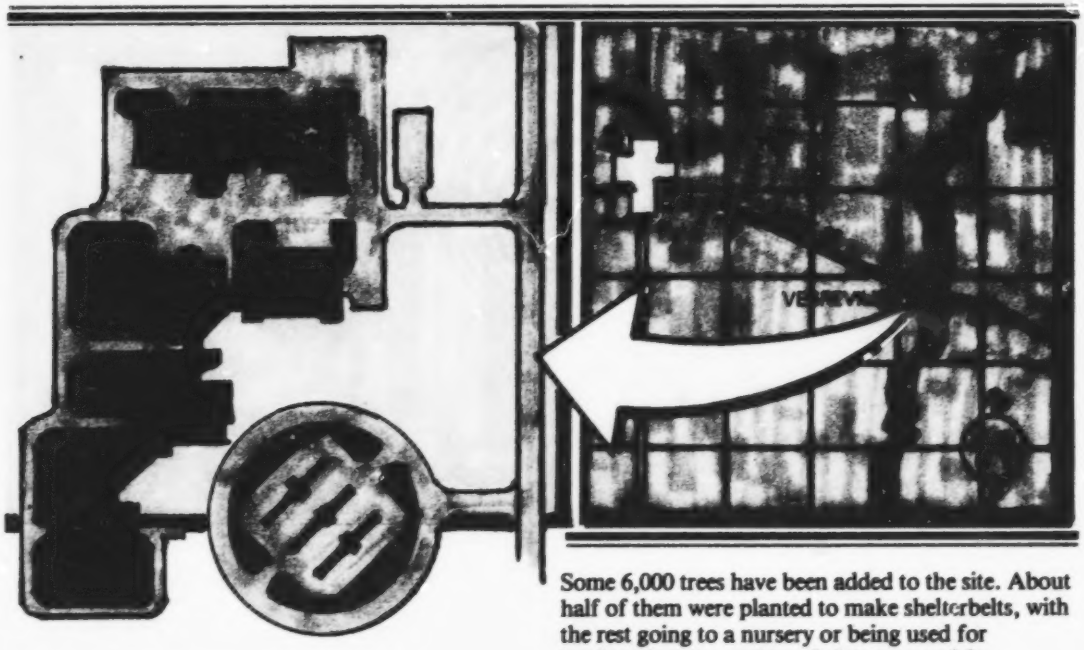
Meeting a New Need

Alberta's rapid economic development has increased awareness of the need to protect and improve our environment. However, evaluating and controlling the impact of technology and growth is a complex operation involving different government departments.

In 1974 the Government of Alberta announced plans for an applied research centre which would allow an inter-departmental and inter-disciplinary approach to environmental issues. Five years later, staff began moving into the Alberta Environmental Centre, a $20 million facility situated just west of Vegreville. The multi-winged, red brick centre was officially opened in June, 1981.

We all depend on a healthy environment, the world's life support system. To keep the system healthy, we require greater knowledge of how it works and how it is affected by technology and change. With its first-rate facilities and dedicated staff, the Alberta Environmental Centre undertakes studies to provide new knowledge about environmental problems and how to solve them.

Location



A WING — ENVIRONMENTAL TECHNOLOGY
B WING — ANIMAL SCIENCES
C WING — COMMON SERVICES
— CHEMISTRY
D WING — PLANT SCIENCES
E WING — GROWTH ROOM ANNEX

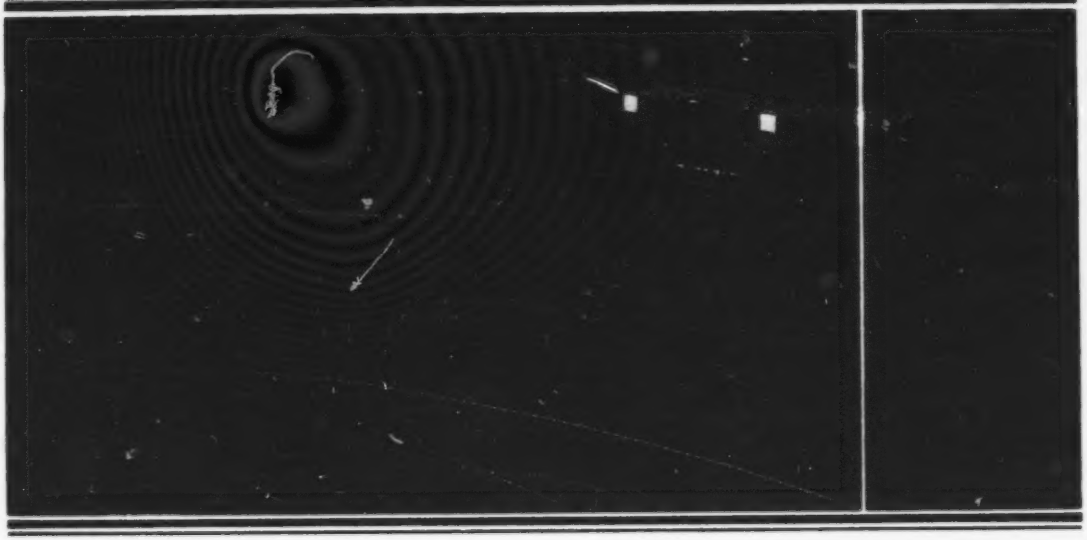
In keeping with the Government's decentralization policy, a site was chosen on the western edge of Vegreville on Highway 16, about 90 km east of Edmonton. The 303.5 hectares of gently rolling terrain — fields and pastures dotted with trees, bushes and an occasional slough — provide an excellent setting for a variety of experiments.

Some 6,000 trees have been added to the site. About half of them were planted to make shelterbelts, with the rest going to a nursery or being used for landscaping. A number of plots are used for pesticide field testing, weed control research, and studies of native plant species which might be used in reclamation projects.

Future plans for the site include development of:

- a wildlife research reserve
- plant science and forestry research areas
- entomology and pest control areas
- ground water and wastewater treatment facilities
- domestic livestock research facilities
- a solid waste disposal research unit
- oil spill study areas
- a public park and picnic area.

Location



Objectives

The concept, design and programs of the Alberta Environmental Centre were planned to meet the following objectives:

- To provide a central facility for investigation and research related to the effects and control of environmental disturbances, whether man-made or natural;
- To conduct chemical, physical and biological testing needed to satisfy requirements of government programs in environmental areas;
- To accommodate and promote co-ordination of environmental activities of Alberta Government departments and agencies;
- To generate scientific and technical information for improved environmental management;
- To provide facilities for special interest groups, students and the public for environmental demonstrations, education and training.

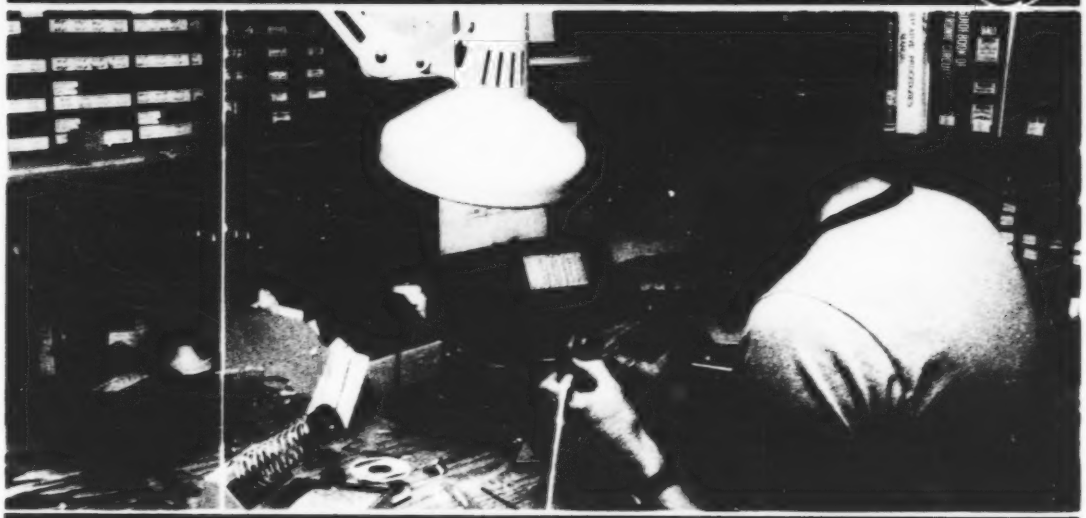
An Integrated Facility

The unique design of the Alberta Environmental Centre facilitates integration while maintaining independent areas or wings devoted to Environmental Technology, Animal Sciences, Chemistry, Plant Sciences and Common Services. Adjacent to the main structure, which covers 16,772.5 square metres, is a 3,065.7-square-metre services building.

When fully staffed, the Centre will employ about 280 persons — 240 from Alberta Environment and 40 from Alberta Government Services. The total personnel figure includes about 75 professionals involved in chemistry, biology, agriculture, engineering, and biomedical sciences. Technical work — in chemical and biological sciences, engineering technology, electronic data processing, forestry, and agriculture — will account for about 125 persons. The balance of the employees will be support staff — clerks, secretaries, laboratory assistants, and a variety of tradesmen.

The main work of each wing is described briefly on the following pages.

Environmental Technology



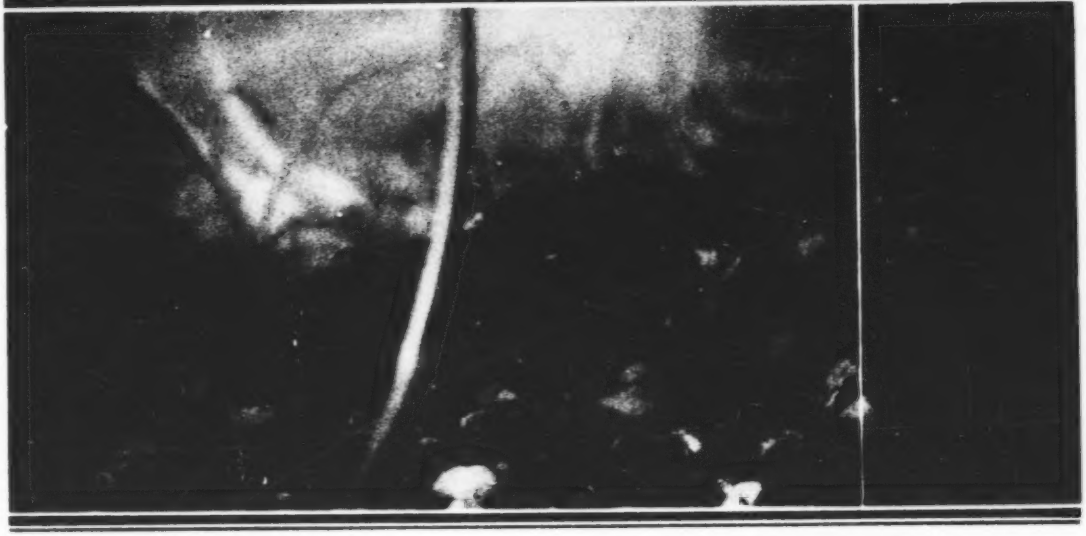
- bench and pilot-scale waste treatment plants
- oil sand and coal mine tailings projects
- municipal water treatment
- feedlot wastes utilization
- radiocarbon and tritium analysis

Technology is the science of industrial arts. This wing is the link between the applied research and service work performed in other wings and the translation of that work into practical technology and equipment which could be developed further by private industry. The Technology Wing also supports other wings in the development, repair, maintenance and calibration of instruments, as well as in preparing models of physical systems. A staff of about 40 persons is employed here.

Environmental problem areas to be investigated include: land reclamation following oil sands and coal mining operations; treatment of industrial wastes; municipal waste handling systems and water treatment problems; control of industrial air emissions; agricultural concerns such as feedlot runoff and dust from seed-cleaning plants; control of leachates, effects on the sub-strata of oil sands tailings; and municipal landfill.

These problems will be tackled on a multi-disciplinary basis, with staff from other wings frequently taking part.

Animal Sciences



- aquatic and wildlife biology
- environmental health
- biological impact
- clinical sciences
- toxicology

The Animal Sciences Wing, with a staff of more than 40, carries out service and research activities relating to the effects of environmental changes on the full range of animal species — from the simplest creatures to man. Information gathered from these studies will help in making decisions which allow man to use the earth's resources to his best advantage, with minimum disruption to other living creatures in the natural environment. Projects in other wings also benefit from the expertise of the Animal Sciences staff.

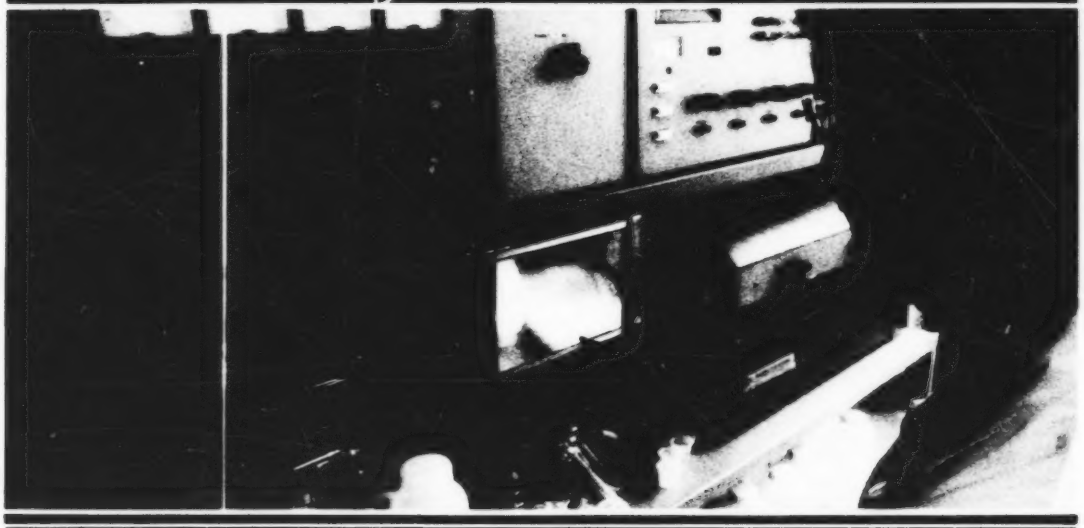
Specific activities of the wing may include:

a) developing and using suitable biological indicator systems to detect and assess environmental changes in air, water and land systems;

b) investigating environment-related diseases of man and other animals, particularly those chemical diseases associated with industry, agriculture and resource development;

c) investigating the effects — existing or potential — of industrial emissions and effluents on man and other animals.

Chemistry



- chemical analysis and chemistry projects
- microbiology services and projects
- electron microscopy services

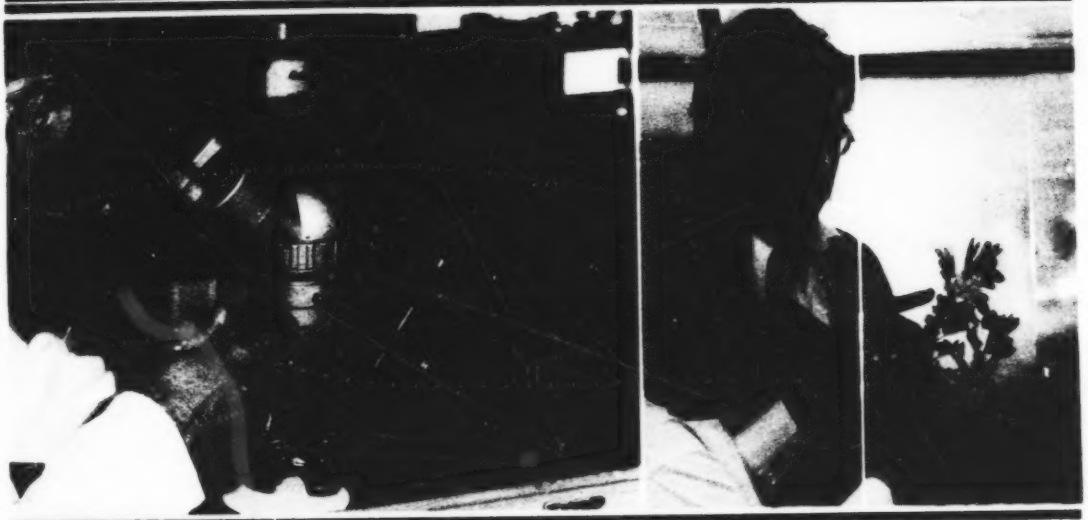
The Chemistry Wing analyzes Alberta drinking water submitted through provincial health units. It also assists other government department programs by analyzing air, industrial stack emissions, water, waste water, and sediment samples. New sampling and analytical methods are developed and incorporated as required.

Service is provided to other wings in the areas of chemical analyses, research projects involving chemical investigations, electron microscopy and the identification of micro-organisms.

Chemical and microbiological projects are planned to investigate pesticide residues in river and lake sediments, organohalogens in drinking water, the potential for microbial utilization of wood pulp, and the degradation of oil spills.

With more than 70 scientists, technicians and support employees, the Chemistry Wing has the Centre's largest staff.

Plant Sciences



- plant diseases
- insects
- weeds
- reclamation

There are two components to the Plant Sciences Wing — the Pest Management Group and the Reclamation Group — with a total staff of about 50.

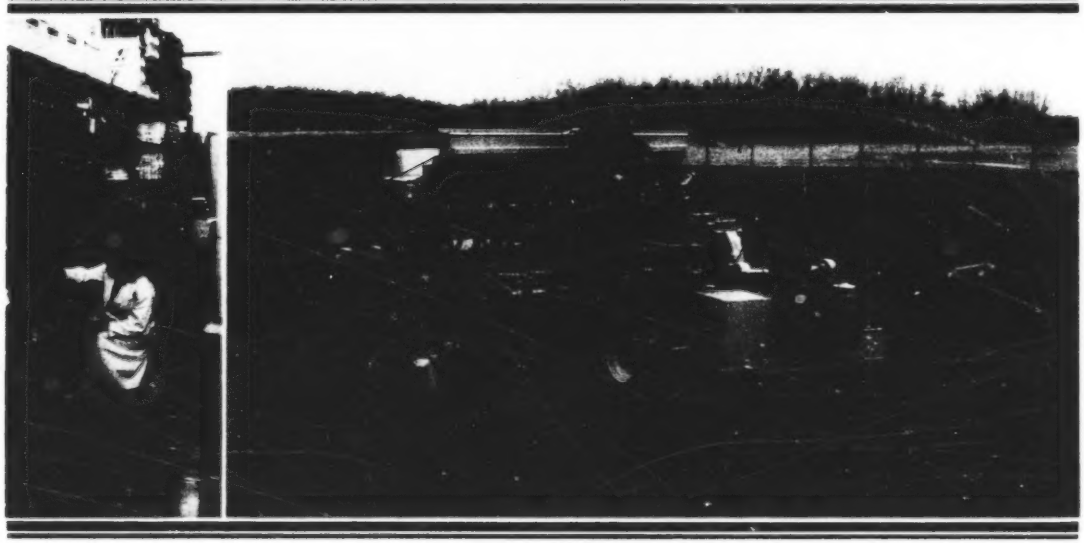
A diagnostic and advisory service is provided by the Pest Management Group, which conducts problem-solving research on those plant diseases, insects and weeds which are pests in agricultural production, homes, gardens, greenhouses, and recreational areas. Service to agriculture is provided through regional crops laboratories, district agriculturists and agricultural fieldmen — usually the first contacts made by producers with a pest problem. The group helps urban populations by giving backup service to horticultural staff who handle calls from homeowners in several Alberta cities.

This kind of assistance is also available to personnel in charge of provincial parks and other recreational areas.

The Reclamation Group is concerned with research in reclamation and revegetation of disturbed sites anywhere in Alberta. Disturbance in balanced ecosystems are the result of open-pit mining, construction of highways, power lines and pipe lines, and heavy park use. Work at the Environmental Centre concentrates on species selection, seed production methods, propagation and planting techniques. Test material consists mainly of native species of grasses, legumes and shrubs. This work is supported with research on soil physics and soil fertility pertaining mainly to non-agricultural areas.

Both groups provide assistance to programs in other wings.

Common Services



- administration and finance
- personnel
- library
- public relations
- technical support
- site management

Administration and technical support services are provided by this wing to all other wings in the Centre. These services include payroll, library, office and other supplies, public and community relations, equipment purchase and servicing, mail distribution, personnel, records management, courier service, printing and duplicating, and central stores.

Drafting and computing are among the technical services available from this wing, as well as glassblowing, photography, electronics and first aid. Site operations and management are also provided.

Through liaison with Alberta Government Services, the wing arranges for cafeteria service, janitorial staff, tradespeople, security, building management, and stationary engineers.

For further information, write or telephone:

Alberta Environmental Centre
Bag 4000, Vegreville, Alberta T0B 4L0
Telephone: (403) 632-6767

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ENVIRONMENTAL CENTRE
Bag 4000, Vegreville, Alberta T0B 4L0
Telephone: (403) 632-6767